

We have hardly begun to explore the potential variety of the oceans' plants and their yields, or the many by-products of the sea's creatures.

Noël Mostert
Audubon, May 1975

ENVIRONMENTAL EDUCATION

Reconstructing the Environment in Iraq

Three wars and a 12-year embargo have cumulatively damaged Iraq's land, air, water, and health infrastructure. Now, as part of efforts to reverse this pattern of damage, the U.S. Agency for International Development has awarded the Stony Brook University Department of Preventive Medicine a one-year grant of \$2.06 million to train faculty and build laboratories and libraries in Iraq.

Three Environmental Health Education and Resource Centers are being established at the university medical schools in Baghdad/Al Mustansiriyah, Mosul, and Basra. Stony Brook researchers will help build infrastructure within the regional centers and provide analytical and technical tools and expertise. The centers will develop and conduct environmental health research, train professionals, and implement preventive intervention programs. The program will also help restore Iraq's higher education institutions.

Even before the recent wars, Iraq's environment was not pristine. Program director Wajdy Hailoo, who is division head of occupational and environmental medicine at Stony Brook, is an Iraqi native. He says Iraq underwent a "mini Industrial Revolution" between the 1970s and 1980s, one that included no attention to environmental controls. Burgeoning cement and fertilizer plants, petrochemical factories, and heavy industries released tons of pollutants. Mercury, arsenic, and lead have been detected in water, especially in the central and southern regions, where general and military manufacturing was concentrated, according to Hailoo. Organophosphates were used heavily to protect crops and eradicate vectorborne diseases, especially in the south. Chlorinated compounds such as DDT were constantly sprayed to kill malaria-transmitting mosquitoes.

War damage to Iraq's health status and public health infrastructure began with the eight-year conflict with Iran in the 1980s. Toxicants from chemical weapons used in the 1980s still contaminate soils in some northern areas. The 1991 Gulf War further stressed the country, as did the United Nations embargo. And the latest war in 2003 added to the environmental contamination. As a further consequence of wars and embargo, Iraqi academics became isolated and fell behind their peers elsewhere.

The most immediate effects of war on environmental health stem from air pollution: burning oil wells, factories, and vehicles

south of Baghdad, attribute their recent hair loss and skin color changes to exposure to radioactive barrels looted from the town's nuclear plant, according to a 31 March 2004 Terra Wire news report. There is also depleted uranium from U.S. military armaments in Iraq, according to Mike Rabbe, a U.S. Army environmental specialist. Rabbe says garbage dumps in Iraq contain hazardous waste whose disposal is completely unregulated and much of which is burned.

One thing is certain: children's health is of major concern, given that more than 40% of Iraqis are under age 14. According to UNICEF, the infant mortality rate has doubled since 1989, and the mortality rate for children under age 5 is two and a half times its 1989 level. UNICEF also reports that children suffer an average of nearly 15 episodes of diarrhea per year, up from 3.8 in 1990, and typhoid cases have spiked from 2,240 to 27,000 in the same period.

To begin making sense of Iraq's environmental health issues, the centers will focus on establishing a baseline database through sampling, testing, and analysis at various regions, especially those that are known to be highly contaminated. Specialized

libraries within the centers will provide access to environmental health books, journals, and databases.

All the centers will be networked with U.S. universities with specialties appropriate to local Iraqi environmental health issues. The Iraqi center directors and senior faculty visited Stony Brook 5–14 May 2004 to discuss how the program will be implemented, and to observe programs and projects at the university. The centers should be operational by February 2005.

The idea, Hailoo says, is to get Iraqi academics out of isolation and bring them up to speed on health issues related to the environment. "Iraqi medicine had been one of the best in that region," he says, "and this program will help move it back in that direction." —Valerie J. Brown



Cooperation out of conflict. An open sewer on the outskirts of Basra shows the environmental devastation wrought on Iraq by decades of war. Three new research and resource centers at Iraqi universities will begin to build capacity for addressing these issues.

pour black smoke containing mercury, sulfur, dioxins, and furans into the skies. Hailoo says oil fires have burned in Iraq since the Gulf War; one Iraqi public health worker told him that "at times you walk in the street in the morning, and by the time you go home your white shirt is black from all the particles in the air."

Poor water quality is another serious problem. Sewage treatment plants all around the country are not working as the result of war damage, looting, and loss of fuel supply. A million cubic meters of untreated sewage enter the Tigris River in Baghdad every day, according to the World Health Organization *Iraq Humanitarian Assistance Report* of 5 April 2004.

Exposure to radioactive materials is also a concern. Residents of Al-Tuwaytha,

HAZARDOUS WASTE

Japan's Toxic Past Resurfaces

Chemical weapons stored by the Japanese army at the end of World War II pose greater health risks than previously thought, according to a recent report by Japan's Ministry of the Environment. The study found chemical weapon stockpiles or damage caused by shells at 81 locations around the country's shoreline, compared with 8 locations noted in a 1973 government report. In all, states the new report, 138 locations had at some point been the site for the manufacture/storage, disposal, discovery, or other issue related to poison gas shells.

Wartime Japan produced an estimated 7,000 tons of chemical weapons, according to the Associated Press (AP). After the war, the military buried over 3,800 tons at locations around the island's shores, according to the 1973 survey. At that time, officials said they knew of no other chemical stockpiles. Many documents on the military's use of chemical weapons were destroyed after the war ended.

The new study reviewed data obtained from various government ministries, local and regional agencies throughout the country, and reports from the general public in an effort to update the 1973 survey. A summary of the recent report noted that the 138 sites named in the report included 114 locations on land as well as 29 at sea (5 locations fell under both categories).

The main chemicals found were mustard gas and an arsenic-based blistering agent called lewisite. Both cause respiratory irritation, vomiting, and skin blisters. Other chemicals were found as well: chlorodiphenyl (which can cause liver damage and irritate the eyes and skin), chloroacetophenone (tear gas), phosgene (a colorless gas that can cause weakness lasting weeks or months), hydrogen cyanide (a colorless gas with a slight almond-like odor that at low-level exposures can cause breathing difficulties, heart pains, vomiting, and headache), and trichloroarsine (which affects respiration and can cause cancer). The report stated that the current understanding of the health effects of these chemical weapons is inadequate.

The report named four sites in the cities of Hiratsuka, Samukawa, Kamisu, and Narashino, all near Tokyo, that require immediate action to protect Japan's residents, and listed other sites

where further research is needed before remediation can begin. "We have to take appropriate measures," said chief cabinet secretary Yasuo Fukuda when the study was released, according to a 28 November 2003 AP report. He added that government agencies would respond quickly, but offered no details.

The report's November 2003 release followed months of speculation and several incidents where the chemicals contaminated soil and water. In September 2002, in Samukawa, a road construction crew struck a buried cache of bottles containing mustard gas and lewisite near a residential area. The crew reported sore throats and blisters on their arms and legs. In April 2003, another cache was discovered in Kamisu, after a local physician treated a woman and her child for arsenic poisoning. Over a dozen residents reported similar problems. Officials found arsenic in local wells at concentrations 450 times the government safety standard, according to a May 2003 report by *U.S. Water News Online*. During the war, Kamisu housed a military airfield and laboratory.

In the new report, Kamisu is listed as a "disposal" and "other" site, while Samukawa is listed under the categories of "manufacture/storage," "disposal/remains," and "discovery/possible damage." At the sites in Narashino and Hiratsuka, environmental studies and procedures to ensure safety during land-use changes are needed, the report concluded. It noted 16 cases in other regions where reliable reports confirmed the presence of weapons presence, but without specific locations.

Some Japanese groups have sought to open records that might contain more information. Yoshiaki Yoshimi, a professor at Chuo University, told the *Kyodo News* on 23 March 2004 that the country's Defense Agency still has thousands of documents on the wartime military that have not been released. He urged that these be disclosed to avert further disasters.

The weapons legacy has also become an international issue with China, where Japanese forces buried an estimated 700,000 chemical warheads in the northeast, according to Keiichi Tsuneishi, a professor of history at Kanagawa University. Under a 1997 treaty, Japan must safely dispose of these chemicals. After a Chinese construction worker was killed when his crew unearthed canisters of mustard gas on 4 August 2003, Japan agreed to pay US\$2.7 million in compensation, *The China Daily* reported in October. Beijing has pressed Japan to accelerate the cleanup efforts throughout China. —David A. Taylor

Water Pollution into Wine

The French ecological group Robin des Bois has issued a statement that production of Beaujolais Nouveau wine has left six French rivers in the Beaujolais region polluted with large amounts of pesticides and two of them—the Azergues and the Saône—with water that is unfit for human consumption, even with filtration. During the grape harvest, the immense wine vats are cleaned repeatedly, releasing 3–5 times the usual volume of pesticide-laden wastewater into local sewage plants and waterways. Over 50 million bottles of the wine were produced for 2003.

The Association of Beaujolais Professional Winegrowers counters that it established pesticide discharge levels in 1997 in line with French law, and that large producers had implemented preventive measures that had reduced pollution by 98% over a six-year period.

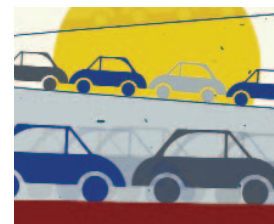


Mist Misses the Mark

Redesigned asthma inhalers are being introduced as manufacturers begin phasing out the ozone-depleting chlorofluorocarbons that once helped propel asthma drugs into the lungs. Some of the new inhalers use hydrofluoroalkane, an environmentally friendly propellant, while others boast a "breath-activated" design, which requires a sharp, quick inhalation, as opposed to the slow, deep intake of the old inhalers. But some people are finding the latter design hard to use—up to 40% of patients are not using breath-activated inhalers properly, and the full dose of medicine is not reaching the lungs. This may put users at risk for serious asthma attacks, especially those, such as the very young and the very old, who may be less able to coordinate their breathing. Doctors recommend that these patients use inhalers with the alternative propellant.

High Cost of Heavy Traffic

The latest annual *Urban Mobility Report*, released in October 2003 by the Texas Transportation Institute at Texas A&M University, found that traffic congestion cost the United States an estimated \$69.5 billion in wasted fuel and lost productivity, and delays are worsening despite steps taken to ease such delays. The average driver wasted about 42 gallons of fuel in 2001 due to congested traffic (up 1 gallon from 2000), and motorists spent 3.5 billion hours in delayed traffic, half of which was caused by accidents, vehicle breakdowns, foul weather, and road work. The four worst cities for traffic were Los Angeles, Chicago, San Francisco, and New York.



HERBAL MEDICINE

Echinacea No Cure-all for Kids

Children suffer an average of 6–8 upper respiratory infections (URIs) each year, each lasting 7–9 days. Decongestants and cough suppressants often provide little relief for children under 12, prompting many parents to try alternatives such as the popular herbal remedy echinacea (*Echinacea* spp.). But a study published 3 December 2003 in *JAMA* suggests echinacea is no better than a placebo at limiting the duration or severity of cold symptoms, and in some cases may cause a rash.

A team led by pediatrics professor James Taylor of the University of Washington analyzed data on 707 URIs in 407 children aged 2–11. Echinacea was used to treat 337 of the URIs, and placebo was used for 370. Parents administered the treatment from the start of the cold until all symptoms had resolved, up to 10 days. They also kept a log of their children's symptoms.

The double-blind study showed the herbal remedy failed to affect the duration or severity of cold symptoms in the children. A mild rash appeared in 7.1% of the treated children, compared with 2.7% of the placebo group. Taylor cautions against giving the herb to allergy-prone youngsters.

His results mirror those of a Wisconsin study published 17 December 2002 in the *Annals of Internal Medicine*, which showed echinacea did not relieve cold symptoms in

adults. Yet several European researchers have reported echinacea does bring relief. Taylor speculates they might have used a higher dose, a different part of the plant, even a different species (Taylor's group used dried *E. purpurea*, from the aboveground plant, in an alcohol-free liquid).

Proponents of alternative medicine offer another explanation. "Echinacea may have more of a role in preventing than treating," says Leanna Standish, a senior research scientist at Washington's Bastyr University and a member of Taylor's research team. Indeed, among children in Taylor's placebo group, 64.4% developed more than one cold during the four-month study, compared with 52.3% of the echinacea group.

To fully understand how herbal remedies work, researchers must isolate the active ingredients. "We need better information on what it takes to make echinacea active," says Diane Birt, director of the NIEHS Center for Research on Dietary Botanical Supplements at Iowa State University. "We need to define the right stuff." —**Cynthia Washam**



Pretty placebo? A new study shows that echinacea performed no better than a placebo to limit the severity or shorten the duration of colds in children.

CANCER

Why Males Are More at Risk for Melanoma

A team of researchers from the University Hospital of Tübingen, Germany, has shown that genetic variations in *BRAF*, a gene previously implicated in malignant melanoma, could account for a substantial proportion of the so-called sporadic form of the disease. Their results, published 14 November 2003 in the online *Journal of Carcinogenesis*, also point toward a possible genetic basis for the well-documented observation that men contract the disease at a much higher rate than women.

The sporadic form of malignant melanoma accounts for about 90% of melanoma cases and involves a complex interaction of genotype and environment. The American Cancer Society estimates more than 55,000 new cases of melanoma will be diagnosed in 2004 in the United States.

The scientists analyzed the genomes of 502 German male and female melanoma patients and 450 healthy control subjects, looking for single-nucleotide polymorphisms (SNPs) that might be significantly associated with elevated risk of sporadic melanoma. They found that certain SNPs in *BRAF*, which encodes a protein that activates the growth and multiplication of cells, showed an association with the disease, mostly in males. They also found six noncoding SNPs and two haplotypes that conferred a significantly increased risk for developing melanoma in male patients. Although these predominantly male risk factors correlate with and may at least partially explain the higher incidence of melanoma in males versus females, the mechanism behind this sex-linked effect remains unclear, as does the role of *BRAF* aberrations in the etiology of melanoma.

"We are interested in addressing the question of whether carrying certain variants of the *BRAF* gene could predispose people to having or developing more moles, and thus to an increased risk of developing melanoma," says principal investigator Claus Garbe. Based on genotype frequencies, they estimate that *BRAF* could put as much as 4% of the German population (both male and female) at risk for the condition, more than four times that attributed to another major melanoma susceptibility gene, *CDKN2A*.

Lead author Peter Meyer says the group also found other genetic variations that might be associated with elevated melanoma risk. He hopes that replication studies and functional approaches will elucidate the significance of these additional findings. "We hope that others will test *BRAF* in their study populations to replicate our results," he says. "Later, functional assays should lead us to understand what are the genetic variations that really influence melanoma risk."

James Evans, director of clinical cancer genetics at the University of North Carolina at Chapel Hill, sees the work as "a potentially important study, as the identification of genetic predisposition toward this common malignancy would be helpful on both the clinical and research fronts." Evans agrees, however, that replication studies will be critical, in the German cohort as well as in other populations. "The human genome is a big place," he says, "and coincidental 'associations' are common."

Ultimately, says Meyer, *BRAF* could be useful as a biomarker for screening purposes to help identify both males and females at heightened risk for melanoma. Those individuals could then be clinically monitored more frequently and counseled to take preventive lifestyle measures such as avoiding the sun. The clinical decision as to whether to prophylactically remove atypical or dysplastic moles, which are potential melanoma precursors, would also be easier in patients identified to carry risk haplotypes. —**Ernie Hood**

ehpnet

Center for Ocean-Land-Atmosphere Studies

Climate change: the news is flooded with stories related to this issue, from the raging debate over whether the Kyoto Protocol is the best way to control climate change, to human-interest stories about rising ocean and flood waters and other climatological changes that are affecting vast numbers of people in almost every region of the world. Behind these stories are an



increasing number of scientific reports providing new support for the premise that climate change is not

a myth but a reality. One of the entities contributing to the state of the knowledge on climate change is the Center for Ocean-Land-Atmosphere Studies (COLA), based at the Institute of Global Environment and Society in Calverton, Maryland.

Scientists from a number of fields have come together at this national center of excellence, which has received funding from the National Science Foundation, the National Oceanic and Atmospheric Administration, and the National Aeronautics and Space Administration. COLA scientists conduct basic science with the goal of developing methods to predict climate variability and gauge predictability based on the intersection of data gathered—as the center's name says—from the oceans, land, and atmosphere. COLA has a website located at <http://grads.iges.org/cola.html> to help disseminate information on the work it is conducting.

COLA scientists work with colleagues both within the United States and abroad on collaborative projects, and are actively involved in a number of national and international research and planning projects. Descriptions of the individual research programs being conducted at COLA are found on the Research page. At present COLA has five different research programs: Dynamical Seasonal Predictability, El Niño and the Southern Oscillation, Climate Dynamics, Tropical Atlantic and Indian Oceans, and The Land Surface and Climate.

For its El Niño and the Southern Oscillation program, COLA uses state-of-the-art coupled circulation models in an effort to determine the predictability of the climate phenomena known as El Niño and La Niña. These phenomena, which are global in nature, have been linked to events such as drought, flooding, and increased or decreased hurricane activity. Within the Research section, visitors can link to in-depth information on COLA's Poseidon Ocean Model and Atmosphere-Biosphere General Circulation Model, including background documentation, user information, and downloadable files. Both models have evolved a great deal since their first incarnations into multilayer tools for modeling variability in complex ocean and atmosphere systems.

Physical processes on land and their relationship to climate on a number of scales is another area that COLA is exploring. Such processes can affect climatic responses to tropical sea surface temperature at both the local and regional levels. COLA is also focusing on how desertification and deforestation are impacting climate as well. Information on COLA's Global Soil Wetness Project and another project studying climate variability over Amazonia is also available within the Research section of the site.

The Publications portion of the site lists journal articles, technical reports, and conference papers on a breadth of topics, all prepared by COLA scientists. Although the site does not offer electronic copies of the journal articles or conference papers, most of the 165 technical reports can be downloaded for free. —Erin E. Dooley

A-maize-ing Plastics

Sony and Mitsubishi Plastic have overcome one of the shortcomings of eco-friendly plastics by developing a new corn-based plastic that's flame-retardant. The material incorporates an unidentified inorganic flame retardant and is as strong as the ABS resin widely used for casings. The recyclable, decomposable plastic will appear on DVD players in fall 2004.

Currently Sony uses corn-based plastics in the components or packaging for only a few products and only in Japan. One of its Walkman products has a housing that is 90% vegetable-derived, using only 40% of the petroleum of conventional plastics and reducing the CO₂ emissions related to plastics manufacture by 20%.

Environmental Heroes

This year marked the 15th annual presentation of the prestigious Goldman Environmental Prize to grassroots activists from six geographic regions.

Each year, winners are selected by an international jury to split a \$125,000 cash award. A survey of past award winners showed that their combined work has impacted the lives of an estimated 102 million people around the world. This year's winners are:

- Margie Richard, of Norco, Louisiana, who successfully campaigned for Shell Chemical to pay fair resettlement costs to area residents who were too poor to move away from a local Shell refinery that emitted pollutants including benzene and nitrogen oxides. Shell also agreed to reduce the plant's emissions by 30%.
- Rudolf Amenga-Etego, of Accra, Ghana, who is fighting a World Bank effort to privatize Ghana's water supply. The plan would impede access to clean drinking water, with the brunt of the burden falling on Ghanaian girls, who are responsible for providing the family water.
- Rashida Bee and Champa Devi Shukla, of Bhopal, India, who organized the first global hunger strike to draw attention to the continuing problems arising from the 1984 chemical disaster near their town. They are suing to get remediation of the factory site and coverage for treatment of continuing health problems.
- Libia Grueso Castelblanco, of Buenaventura, Colombia, who secured territorial rights to over 5.9 million acres for the country's rural black citizens, who have lived on the land for hundreds of years.
- Manana Kochladze, of Tbilisi, Georgia, who is fighting to block a major oil pipeline that would run through a pristine wilderness area.
- Demetrio do Amaral de Carvalho, of Dili, East Timor, who ensured that environmental justice was addressed in that nation's new constitution, helping to guide sustainable management of East Timor's rainforests, coral reefs, and other natural resources.

